Experiences Evoked by Today's Technology - Results from a Qualitative Empirical Study

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Abstract

In this paper we present the results of a qualitative study regarding the experiences evoked by today's technology. Our goal was to gain better understanding on the content, generation and progression of everyday experiences of users with all kinds of artifacts such as computer software, mobile devices, consumer products and even hardware tools. We conducted semi-focused interviews with the goal of starting narrations by the users about their encounters and interactions with technology and artifacts. The interviews then were analyzed line-by-line following a classical qualitative approach enriched with knowledge from the field of structural analysis of oral narrations. The results provide insights on how users organize their experiences and which factors are relevant for evoking positive or negative experiences.

Key words: User Experience, User-System Relationship, Interaction Design, Qualitative Study, Narrative Approach

1. Introduction

User experience as a relatively new concept has attracted a lot of attention in the field of Human Computer Interaction in the last couple of years. Especially with the advent of intelligent systems that are capable of acting more autonomously and the potential to better understand the users needs and intentions there is the hope that the end users experience can be optimized. Additionally, the increasing introduction of technological devices into application areas besides the office domain that brings along new priorities produces an increased interest in user experience, beyond usability. Technology that was previously seen as utilitarian, a tool, becomes more and more technology to play with. This shift in goals asks for a shift in design towards the more general user experience.

Several helpful models and frameworks on user experience have been developed recently with the goal to better understand the users experience and to identify and systemize the factors influencing and constituting it [see e.g. Arhippainen & Tähti (2003); Csikszentmihalyi & Rochberg-Halton (1981); Jääskö & Mattelmäki (2003)]. A common point of view is that the subjective experience can not be evoked directly by designers. They can only design the context for experiences; users have the last word in how they ultimately choose to use the product and how they assess and experience the interaction.

Besides these theoretical approaches several empirically based studies with the aim to better understand and/or evaluate user experience have been conducted in different domains. Kidd (2002) e.g. studied the visitor experiences at an interactive science museum and identified three major dimensions of a compelling experience: the dimension of challenge and self expression, the dimension of drama and sensation, and the social dimension. Steen, Koning & Hoyng (2003) as another example focused their research on the questions: When do people experience *wow*? What does this *wow* consist of? and identified a provisional list of *wow* factors: nostalgia, fantasy, sensorial experience, amazement, surprise, beauty, exclusivity, budget, comfort, mastery, connectedness, own world, care, competition and inspiration.

Another approach to the topic is to focus on meaningful user product relationships. In their classical work Csikszentmihalyi & Rochberg-Halton (1981) developed an exhaustive classification on the meaning of things. Based on this work Battarbee & Mattelmäki (2004) extracted three main categories for meaningful relationships to better suit the needs of designers. These are: meaningful tools, meaningful associations attached to products; and living objects & products that people become fond of and to which they are attached.

The starting point for our study was our current work on researching the user experience of advanced vision systems within the Austrian joint research project "Cognitive Vision". The overall goal regarding HCI there is to develop a comprehensive interaction paradigm for cognitive vision based intelligent systems - a challenging task that calls for a very good understanding of the current experiences with advanced systems.

Even though substantial work has been done on different aspects of user experience only few studies exist focusing on current experiences with existing system and devices used on a widespread basis. The goal of our study is to better understand today's experiences that take place in a real context. Special focus was laid on advanced interactive systems that make use of "intelligent" techniques and/or are capable of acting "autonomously" as they have the potential to offer the user a more natural way of interacting and transform the "traditional" user system relationship. Our aim is to identify characteristics of current experiences, compare these with existing conceptualizations of user experience and possibly detect relevant phenomena.

2. Method

User experience research has triggered the development of several new methodological approaches such as cultural probes [Gaver, Dunne, & Pacenti (1999)] and perspective sorting [Forlizzi, Gemperle & DiSalvo (2003)]. The need for such developments reflects the difficulties in making the users experience accessible to the researcher. We were challenged with the same problem, but also limited in the choice of applicable methods due to our focus on widespread and real-life experiences. We eventually decided to use an interview approach focusing on starting narrations about real-life experiences based on the work of Schütze (1976). The focus on eliciting narrations allows us to make use of the structural peculiarities story-telling follows, i.e. that the emotional content of the story is re-enacted during the narration. Stories provide a more direct access to the experience than evaluative questions. With stories as base material the analysis can also consider structural elements of the narrations and characteristics of the used language.

The interviews started with completely open questions except the focus on emotional encounters with artifacts that they experienced themselves. Next, the interviewees where asked to tell stories containing positive and negative experiences with technological products. Finally, they were asked about situations with special emotional contents (fun, frustration, feeling connected to people, sharing experiences with others, feeling intimate with a system, trusting a system; these special topics where selected based on the work mentioned in the introduction).

The participants were recruited from our data base, which contains about 2000 persons who are interested in participating in usability tests and studies. The criteria for invitation were that the participant could be characterized as a heavy user of new technologies and had wide experience with different kinds of systems such as office PCs, games, internet chats, mobile devices, etc. The target was to find people that already had the chance to encounter different situations with advanced interfaces that are used for everyday purposes. This might introduce a bias in the study insofar that our participants were not the average user. The selected participants, however, would be able to provide us with more insight in respect to new technology with their experience.

We followed the approach suggested by Glaser & Strauss (1967) to analyze the results of the interviews. Additionally knowledge from the field of structural analysis of oral narrations was used to enhance this approach [Schütze (1976)]. Two researchers worked independently on the texts to ensure inter-subjectivity of the interpretations.

Due to the time-consuming character of in-depth qualitative analysis and the explorative character of the study - we were mainly interested in digging deep instead of producing statistically significant results - the number of interviews was limited to five.

The interviews were conducted in our experience lab in a leisurely environment to foster communication. Each interview took between 90 and 120 minutes and was audio taped. Analysis was based on transcriptions of the audio data, but the audio files were used during analysis as an additional source in cases where interpretations based on the transcriptions were ambiguous. The interviews were conducted in German. The samples used below are translated into English by the authors.

The results of the interviews are described below. From the analysis of the transcriptions two main areas of interest emerged. The first area consists of the characteristics of current experiences. The second area of interest is the relationship the user experiences with the system.

3. Results - Characteristics of current experiences

3.1 Exploration, Challenge and Autonomy Are Key Factors for Positive Experiences

The detailed analysis of the interviews showed that positive experiences are mostly related to the aspects exploration, challenge and/or autonomy:

- *Exploration:* Many narrations about positive experiences contained as key element explorations of "new territories" with the potential to discover novel and interesting possibilities. An interesting structural aspect of these exploration activities was that the outcome - i.e. if the user actually discovered something helpful - was only of secondary nature. Exploration was experienced as a satisfying activity in its own right.

- *Challenge:* Another frequent starting point for positive experiences was a challenge that matched the ability of the user. Participants mentioned difficult situations that they could solve with the help of a system as example. An interesting aspect of this is that the difficulty typically was not introduced by the system but by factors outside the user-system-interaction (with the exception of games).
- *Autonomy:* Positive experiences included the increase of the perceived autonomy of the person. A participant for example described a system that allowed doing things that weren't possible to do before, like chatting with friends far away at low cost, which increases the sense of autonomy of the user. The relationship between autonomy and experience can be inverted dramatically if the system doesn't function well - the autonomy switches into dependence and the experience becomes a negative one.

A good example for a positive experience containing all three aspects is when a user learns to use a system auto-didactically – a situation mentioned strikingly frequent as example for positive experiences. To learn a new system it has to be explored. This is sometimes challenging (but should not be too difficult) as the user learns more and more of the system. Once the user has mastered the system, the experience and the functionality of the system increase the autonomy of the user and allow the user to do things that were out of reach before.

3.2 Negative Experiences Are Frequently Related to Problems with Functionality

Another interesting trend was that almost all negative experiences that were mentioned were in some way or the other related to functionality. Either the system was broken, important functionality was missing or the system behaved in an unexpected and not understandable way so users were not able to employ the available functions meaningfully. These problems with functionality and usability lead to a very negative experience on the user's side. However, a system that is usable and has no functionality problems does not immediately give the user a positive experience but merely a neutral one. Functionality simply is seen as a prerequisite for a positive experience, but does not create one by itself.

3.3 Negative Experiences Evolve Around Missing Understanding

A second aspect most negative experiences have in common is that the users had no understanding what's going on why and what to expect. To enable users to interact in an positive and engaged way with systems, they need to have a good understanding of what's going on, they need to develop realistic expectations regarding future system behavior and they need to feel in control. These are three necessary prerequisites for the user to allow an easygoing interaction with a system, but these were not met in the experiences described by our participants. It is important that the design of a system allows users to create an appropriate mental model and expectations and give the user control. An additional challenge for designing intelligent systems lies in providing the user with means to understand autonomic behavior - an area were existing systems frequently fail.

3.1 Negative Experiences Dominate

A remarkable general trend within the interviews was that negative experiences dominate both in terms of frequency and in terms of intensity. Negative experiences such as e.g. frustration, anger or annoyance were mentioned far more often than positive ones. Negative experiences were told using more emotionally loaded terms and the structural organization of the narrations showed stronger patterns indicating emotional activation. Typical terms that were used to describe positive experiences were "quite good" or "nice". For negative

experiences people used terms comparable to that used for positive experiences like "bad" and "frustrated", but they also used very expressive phrases like "hit rock bottom" or "it gives me the willies". Additionally it took people on average less time to recall or find an example of negative experiences than examples of positive ones.

3.5 New or Known Modifies Experience

Novelty is a major factor in the organization of experience. People are very aware that their experiences change over time and that their expectations towards a new system are different than their expectations towards a known system, one they use on a regular basis. What is perceived as an interesting and helpful interaction in the beginning can become an insulting and annoying experience in the long run and vice versa. The more users interact with a system, the more they learn about the system. As the novelty wears off, their demands change. Systems that are able to react on a change in demands might create a better user experience.

3.6 Timing is important

Besides the three key factors described, timing of system events is an important aspect of the user experience. When analyzing the sequential organization of experiences it became clear that untimely actions by the system can flip a formerly positive perceived process into an offending experience. In contrast, an unexpected but helpful intervention by the system can trigger positive experiences as for example thankfulness. To enable positive experience actions initiated by the system must match with the user's needs and expectations.

3.7 Experiences with Intelligent Systems

One area of special interest of this study is to better understand the experience with existing systems that make use of advanced interaction methods and are capable of acting in a more or less "intelligent" way. The participants in the interviews were early-adopters and were familiar with "intelligent" and "autonomous" behavior as used in current recommender systems, avatar & agent systems, games and advanced mobile devices.

One main result of our analysis regarding this aspect is that people didn't tend to characterize systems as intelligent at all. Attributions like "intelligent" or "clever" can be found nowhere in the interviews, whereas characterizations like "stupid" or "dull" do appear from time to time to describe "intelligent" systems that are currently in use. To describe the positive aspects of systems our interviewees used terms like "powerful", "effective" and "helpful".

In fact there was not only a lack of positive experiences but a general negative tendency towards intelligent systems: interviewees frequently mentioned negative and annoying experiences with systems that behaved "pseudo-intelligent". The typical dramaturgy in this cases consisted of the arousal of expectations by the system which then resulted in a disappointment because the system could not live up to these expectations. What is characterized as intelligent systems by researchers and developers doesn't mean that users see these systems the same way.

4. Results - User System Relationships

4.1 I Can Count on You

Regarding the perceived and (implicitly or explicitly) expressed relationship between the user and the system the most interesting result is that reliability is at the core of values that users appreciate in a user-system relationship. This is not only related to the above mentioned importance of functionality but also has to be understood in comparison to human-human relationships. It's especially what is different in technology that makes it appealing. Typical statements by our interviewees expressing this were e.g. "it doesn't disappoint me" or "I can count on it". This can also explain the importance of functionality as problems with it interfere with this model of relationship. This aspect is especially relevant for advanced systems, as with the emerging new interaction styles this model of relationship might be challenged.

4.2 Intelligence Doesn't Necessarily Score in Relationships

Only very rarely users described or told stories about a more emotional relationship to a system or product besides seeing it as a helpful and reliable tool. Interestingly these relations did not occur with highly advanced systems but rather simple ones. Whereas variations of the characterization "tool" were typical for advanced computers the most emotional relations can be found with relatively unintelligent systems like a motorbike or a mobile phone. When we analyzed the according interview sections the following interpretation that might explain this phenomenon emerged:

4.3 Usage Determines the Type of Relationship

It seems that a user's attitude is much more influenced by how a device is used than what the device is capable of. If users use a mobile phone to communicate with friends, the mobile phone becomes also kind of a friend; if the system is always running it becomes a companion; if a device is used for work it becomes a tool, and so on. The emotional characteristics of the usage situation - independent of the devices capabilities - are coloring the overall impression of and relationship to the device. There seems to be no intrinsic property of the device that defines the relationships, there are just potentials that can make a relationship possible. If that also occurs mostly depends on the specific usage of the system.

5. Discussion

Comparing the overall results of these study with existing conceptualizations [Arhippainen & Tähti (2003); Battarbee & Mattelmäki (2004); Forlizzi & Ford (2000); Jääskö & Mattelmäki (2003); Kidd (2002); Steen, Koning & Hoyng (2003)], it seems to be that most of the findings in general are in line with existing work, and our work provides additional aspects and facets to factors already identified. A novel point that is indicated in the results is that the different factors of influence as mentioned in the frameworks cannot be seen as equally important and have to be balanced carefully to enable positive experiences. The results of this study can help to find the right mixture when designing systems.

Another novel result is the relative dominance of negative experiences. Negative experiences in general are easier to recall and describe than positive ones, which is probably one reason why they are also described more often in our interviews. However, it is important to note that this is the way users perceive systems and how they choose to describe the interaction with

such systems. The fact that users see systems often in a negative way is something that interaction designers should be aware of.

Our results strengthen the position that designers can not evoke positive experiences directly, but the results also show that there are several mistakes which could be avoided easily that can turn a positive experience into a negative one. Based on these considerations we want to provide recommendations for practitioners that are concerned with the design of products that do not function merely as a tool, but can create a positive user experience:

- Do not forget about the traditional values of functionality, usability and utility while designing for experience, as these are prerequisites to even a neutral experience.
- Add functionality with care, and be sure it works well and it's still relatively easy for the user to understand, as missing understanding leads rapidly to an overall negative experience.
- The system should provide the user with realistic expectations towards what it is able to do, but more importantly also make clear what it cannot do. Failing to live up to the expectations of the user reduces the overall experience.
- Support approaches that invite the user to explore the system and provide possibilities for playful interaction without dead ends while not placing excessive demands on the user. Introducing challenges that match the ability of the user is one of the key factors that make up a positive user experience.
- Find ways to communicate the systems behavior to the users, so they can understand it. Especially in the case of intelligent systems that behave partly autonomic, it is important to provide clarity to the users about what is happening and leave the user in control.
- Take care of proper timing and do not interrupt the user without a good cause, s/he may just have an exciting experience.

6. Conclusions

This paper discussed the everyday experiences evoked by today's technology based on qualitative interviews. We were able to identify interesting phenomena, such as the dominance of negative experiences, the importance of functionality and understanding and the influence of usage on the user-system relationship. The results of this work can be helpful for designers in determining the aspects on which to emphasize when designing for experience.

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References

Arhippainen, L., Tähti, M. Empirical Evaluation of User Experience in Two Adaptive Mobile Application Prototypes. Proc. MUM 2003, 27 - 34.

Battarbee, K., Mattelmäki, T. Meaningful Product Relationships. In McDonagh, D., Hekkert, P., van Erp, J. and Gyi, D. (ed.) *Design and Emotion – The Experience of Everyday Things*, Taylor&Francis, London, 2004

Csikszentmihalyi, M., Rochberg-Halton, E. *The Meaning of Things:Domestic Symbols and the Self*. Cambridge University Press. Cambridge, MA: 1981

Forlizzi, J., Ford, S. The building blocks of experience: an early framework for interaction designers. *Proc. DIS 2000*, ACM Press (2000), 419 - 423.

Forlizzi, J., Gemperle, F., DiSalvo, C. Perceptive sorting: a method for understanding responses to products. Proc. DIS 2003, ACM Press (2003), 103-108.

Gaver, B., Dunne, T. and Pacenti, E. Design: Cultural probes. *interactions 6,1*. (1999), 21-29.

Glaser, B.G., Strauss, A.L. *The Discovery of Grounded Theory: Strategies for Qualitative Research.* Aldine Pub. Co, Chicago, 1967.

Jääskö, V., Mattelmäki, T. Observing and probing. *Proc. DPPI 2003*, ACM Press (2003), 126 - 131.

Kidd, A. Technology Experiences: What makes them Compelling?, HP Laboratories Bristol, HPL-2002-338. 2002. http://www.hpl.hp.com/techreports/2002/HPL-2002-338.pdf

Schütze, F. Zur soziologischen und linguistischen Analyse von Erzählungen. *Internationales Jahrbuch für Wissens- und Religionssoziologie 10* (1976), 7-41.

Steen, M., Koning, N.d., Hoyng, L. The ‘wow’ experience – Conceptual model and tools for creating and measuring the emotional added value of ICT. *Proc. COST269 Conference Good Bad Irrelevant* 2003.